13.56-MHz ENCAPSULATED PLUS TRANSPONDER

FEATURES

- **ISO/IEC 15693-2,-3; ISO/IEC 18000-3 Compliant**
- **13.56-MHz Operating Frequency**
- **2048-Bit User Memory in 64 × 32-bit Blocks**
- **User and Factory Lock Per Block**
- **Application Family Identifier (AFI)**
- **Data Storage Format Identifier (DSFID)**
- **Combined Inventory Read Block**

APPLICATIONS

- **Laundry**
- **Process Automation**
- **Product Authentication**
- **Asset Management**

DESCRIPTION

Texas Instruments' 13.56-MHz encapsulated plus transponder is compliant with the ISO/IEC 15693 and ISO/IEC 18000-3 global open standards. This product offers a user accessible memory of 2048 bits, organized in 64 blocks and an extensive command set.

Designed for harsh environments, such as garment tracking in laundries, each transponder has a 64-bit factory programmed Read Only Number, which is also laser engraved on the transponder housing. Prior to delivery, transponders undergo complete functional and parametric testing to provide the high quality that customers have come to expect from TI.

The 13.56-MHz encapsulated plus transponders are well suited for a variety of applications including but not limited to: laundry garment tracking, process automation, product authentication, and asset management.

ABSOLUTE MAXIMUM RATINGS

over operating free-air temperature range (unless otherwise noted)

	RF-HDT-DVBB	UNIT
Operating Temperature	–25 to 90	°C
Storage Temperature	–40 to 120 (130°C for total 50 hours, 220°C for total 30 seconds)	°C

OPERATING CHARACTERISTICS

over operating free-air temperature range (unless otherwise noted)

PARAMETER	RF-HDT-DVBB(1)	UNIT
Supported standard	ISO/IEC 15693-2,-3; ISO/IEC 18000-3	
Resonance frequency (at 25°C)	13.56 MHz ± 300 kHz	
Typ. required activation field strength to read (at 25°C)	112	dBµA/m
Typ. required activation field strength to write (at 25°C)	115	dBµA/m
Factory programmed read only number	64	bits
Memory (user programmable)	2k bits organized in 64 × 32-bit blocks	
Typical programming cycles (at 25°C)	100 000	
Data retention time (at 25°C)	>10 years	
Simultaneous identification of tags	Up to 50 tags per second (reader/antenna dependent)	
Dimensions	ø 22 ± 0.2 mm × 3 ± 0.2 mm	
Weight	2.1 ± 0.2	grams
Case material	PPS, black	
Protection class	IP 68	
Vibration	ISO/IEC 68.2.6 (10 g, 10 to 2000 Hz, 3 axis, 2.5 h)	
Mechanical shock	ISO/IEC 68.2.27 (100 g, 6 ms, 6 axis, 20 times per axis)	
Mechanical stability	Axial compression strength: 1000 N (10 s, static) Radial compression strength: 500 N (10 s, static) Isostatic water pressure: 45 bar (10 h)	
Chemical resistance	Typical chemicals used in laundry and dry-cleaning processes	
Delivery	1000 units in bulk	

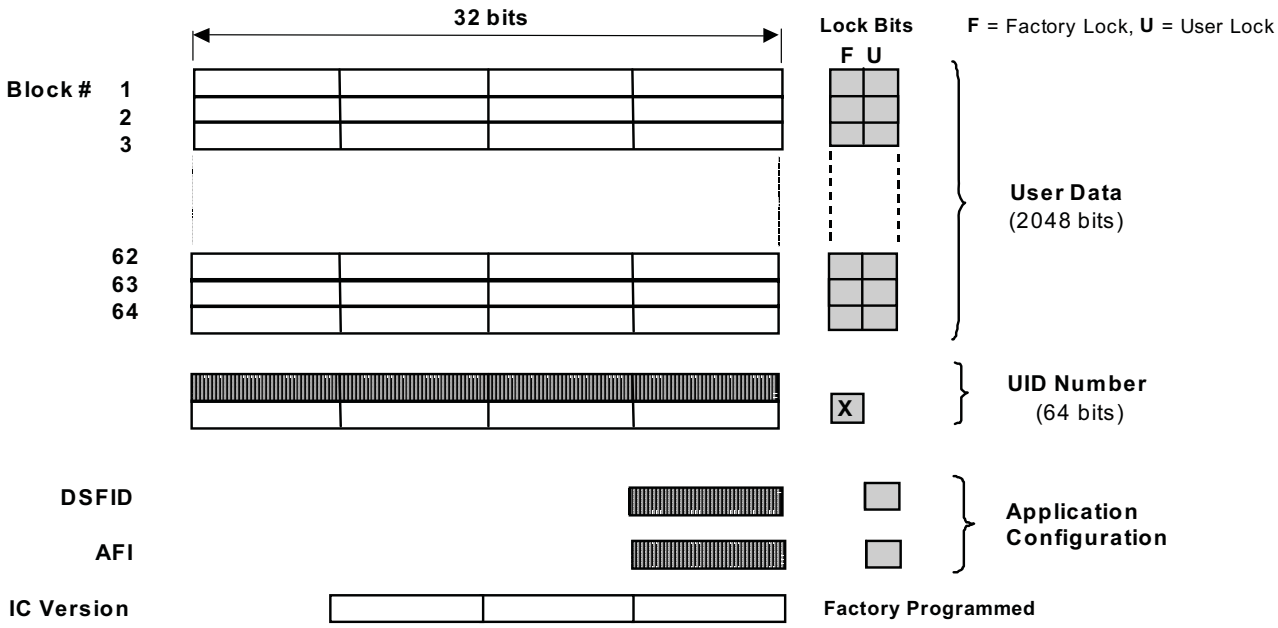
(1) For highest possible read-out coverage, TI recommends operation of readers at a modulation depth of 20% or higher.

SUPPORTED COMMAND SET

REQUEST	REQUEST MODE(1)					
	REQUEST CODE	INVENTORY	ADDRESSED	NON-ADDRESSED	SELECT	AFI
ISO 15693 Mandatory and Optional Commands						
Inventory	0x01	√	–	–	–	√
Stay Quiet	0x02	–	√	–	–	–
Read_Single_Block	0x20	√	√	√	√	√
Write_Single_Block	0x21	–	√	√	√	–
Lock_Block	0x22	–	√	√	√	–
Read_Multi_Blocks	0x23	√	√	√	√	√
Write_Multi-Blocks	0x24	–	–	–	–	–
Select Tag	0x25	–	√	–	–	–
Reset to Ready	0x26	–	√	√	√	–
Write_AFI	0x27	–	√	√	√	–
Lock_AFI	0x28	–	√	√	√	–
Write DSFID	0x29	–	√	√	√	–
Lock DSFID	0x2A	–	√	√	√	–
Get_System_info	0x2B	√	√	√	√	√
Get_M_BLK_Sec_St	0x2C	√	√	√	√	√
TI Custom Commands						
Write_2_Blocks	0xA2	–	√	√	√	–
Lock_2_Blocks	0xA3	–	√	√	√	–

(1) √: Implemented, – : Not applicable

MEMORY ORGANIZATION



PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
RF-HDT-DVBB-N2	ACTIVE	RFIDP	TEC	0	1000	RoHS (In Work) & Green (In Work)	Call TI	N / A for Pkg Type	-25 to 90		Samples

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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